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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/882,087	06/15/2001	Shuo-Yen Robert Li	Li 9	8802

7590 03/04/2005

John T. Peoples
14 Blue Jay Court
Warren, NJ 07059

EXAMINER	
PHAN, TRI H	

ART UNIT	PAPER NUMBER
2661	

DATE MAILED: 03/04/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/882,087	Applicant(s) LI, SHUO-YEN ROBERT	
	Examiner Tri H. Phan	Art Unit 2661	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 September 2001*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *22-42* is/are pending in the application.

4a) Of the above claim(s) *1-21* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *22-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 June 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *9/11/2001*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the Response/Amendment filed on September 11th, 2001. Claims 1-21 are now canceled and new claims 22-42 are added. Claims 22-42 are now pending in the application.

Specification

2. The disclosure is objected to because of the following informalities:

In page 13, line 15, FIG. "28A" is a typographical error; it should be correct to -- 28B --.

In page 14, line 12, FIGS. "33A-D" is a typographical error; it should be correct to – 33A-F --.

In page 17, line16, the brief description of the FIGS. 56A-D is missing.

Appropriate corrections are required.

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Double Patenting

4. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

5. Claims 22-42 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-21 of U.S. Patent No. 6,657,998 B2 (hereinafter '998'). Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following:

For claims 22-38, the claims 1-17 of patent number '998' disclose the method for implementing a class of N.times.N unimodal-circular nonblocking switches each serving a connection request to route a plurality of incoming signals and for enabling the service of any connection request in a nonblocking way on the condition that the connection request is compliant to certain constraints, the method for each of the unimodal-circular nonblocking switches comprising configuring a switch defined by a set of connection states and having an array of N input ports with N distinct input addresses 0, 1, . . . , N-1 and an array of N output ports with N distinct output addresses 0, 1, . . . , N-1, the switch accommodating every complete matching between all N input addresses and all N output addresses by one of its connection states on the condition that, under the matching, the input addresses are a circular unimodal function of the output addresses, where a complete matching between all N input addresses and all N output addresses is equivalent to a combination of N concurrent point-to-point connections from the N input addresses to the N output addresses, and wherein the constraints on the connection request are that: there exists a combination of N concurrent point-to-point connections corresponding to a complete matching accommodated by the switch such that each of the incoming signals in the connection request arriving at a distinct one of the input ports and destined for a distinct one of the output ports determines a point-to-point connection which coincides with one of the point-to-point connections of the combination of N concurrent point-to-point connections accommodated by the switch, and routing the incoming signals from their

respective input ports to the corresponding output ports by activating one of the connection states such that the activated one of the connection states accommodates the connection request subject to the constraints on the connection request (see claim 22).

wherein the configuring a switch includes constructing the switch as an N.times.N k-stage switching network composed of k stages of nodes, an interstage exchange between any succeeding two of the k stages, an input exchange and an output exchange, and wherein each node is filled with another switch (see claim 23).

wherein the configuring a switch includes constructing the switch as an N.times.N k-stage switching network composed of k stages of nodes, an interstage exchange between any succeeding two of the k stages, an input exchange and an output exchange, and wherein each node is filled with a unimodal circular nonblocking switch (see claim 24).

wherein the configuring a switch includes constructing the switch as a two-stage interconnection network composed of a first stage of nodes being the input nodes and a second stage of nodes being the output nodes, an interstage exchange, and an output exchange corresponding to the interstage exchange appended to the network, and wherein each node is filled with a unimodal-circular nonblocking switch (see claim 25).

wherein the configuring a switch includes constructing the switch as a 2X interconnection network having nodes and wherein each node is filled with a unimodal-circular nonblocking switch (see claim 26).

wherein the configuring a switch includes constructing the switch as a 2X interconnection network having nodes and wherein the nodes are filled with a plurality of unimodal-circular nonblocking switches (see claim 27).

wherein the configuring a switch includes constructing the switch as a recursive 2X interconnection network having nodes and wherein each node is filled with a unimodal-circular nonblocking switch (see claim 28).

wherein the configuring a switch includes constructing the switch as a recursive 2X interconnection network having nodes and wherein the nodes are filled with a plurality of unimodal-circular nonblocking switches (see claim 29).

wherein the configuring a switch includes constructing the switch as a recursive 2X interconnection network having nodes and wherein each of the nodes is a cell and each cell is filled with a 2.times.2 unimodal-circular nonblocking switch (see claim 30).

wherein the 2.times.2 unimodal-circular nonblocking switch is a switching cell (see claim 31).

wherein the configuring a switch includes constructing the switch as a recursive 2X interconnection network of cells with each cell filled with a 2.times.2 unimodal-circular nonblocking switch (see claim 32).

wherein the 2.times.2 unimodal-circular nonblocking switch is a switching cell (see claim 33).

wherein the configuring a switch includes constructing the switch as a banyan-type network whose trace and guide are both monotonically decreasing and wherein each of the 2.times.2 nodes of the banyan-type network is filled with a 2.times.2 unimodal-circular nonblocking switch (see claim 34).

wherein the 2.times.2 unimodal-circular nonblocking switch is a switching cell (see claim 35).

wherein the configuring a switch includes constructing the switch as a recursive plain 2-stage interconnection network of cells appended with a swap exchange and wherein each cell of the network is filled with a 2.times.2 unimodal-circular nonblocking switch (see claim 36).

wherein the 2.times.2 unimodal-circular nonblocking switch is a switching cell (see claim 37).

wherein the configuring a switch includes constructing the switch as a divide-and-conquer network of cells appended with a swap exchange and wherein each cell of the network is filled with a 2.times.2 unimodal-circular nonblocking switch (see claim 38).

For claims 39-42, the claims 18-21 of patent number '998' disclose the class of N.times.N unimodal-circular nonblocking switches each serving a connection request to route a plurality of incoming signals and for enabling the service of any connection request in a nonblocking way on the condition that the connection request is compliant to certain constraints, each of the unimodal-circular nonblocking switches comprising a switch defined by a set of connection states and having an array of N input ports with N distinct input addresses 0, 1, . . . , N-1 and an array of N output ports with N distinct output addresses 0, 1, . . . , N-1, the switch accommodating every complete matching between all N input addresses and all N output addresses by one of its connection states on the condition that, under the matching, the input addresses are a circular unimodal function of the output addresses, where a complete matching between all N input addresses and all N output addresses is equivalent to a combination of N concurrent point-to-point connections from the N input addresses to the N output addresses, and wherein the constraints on the connection request are that: there exists a combination of N concurrent point-to-point connections corresponding to a complete matching accommodated by the switch such that each of the incoming signals in the connection request arriving at a distinct one of the input ports and destined for a distinct one of the output ports determines a point-to-point connection which coincides with one of the point-to-point connections of the combination of N concurrent point-to-point connections accommodated by the switch, and control circuitry, coupled to the switch, for routing the incoming signals from their respective input ports to the corresponding output ports by activating one of the connection states such that the activated one of the connection states accommodates the connection request subject to the constraints on the

connection request (see claim 39).

wherein the switch is constructed by an N.times.N k-stage switching network composed of k stages of nodes, an interstage exchange between any succeeding two of the k stages, an input exchange and an output exchange, and wherein each node is filled with another switch (see claim 40).

wherein the switch is constructed by an N.times.N k-stage switching network composed of k stages of nodes, an interstage exchange between any succeeding two of the k stages, an input exchange and an output exchange, and wherein each node is filled with another unimodal-circular nonblocking switch (see claim 41).

wherein the switch is constructed from a two-stage interconnection network composed of a first stage of nodes being the input nodes and a second stage of nodes being the output nodes, an interstage exchange, and an output exchange corresponding to the interstage exchange appended to the network, and wherein each node is filled with another unimodal-circular nonblocking switch (see claim 42).

For claims 22-42, the claims 1-21 of the patent number '998' disclose all the subject matter of the claimed invention with the exception for the switch and method of using expander type for providing multicast switch and recursive X2 interconnection network of cells, e.g. a banyan-type network with monotonically increasing trace and guide. However, using expander for providing multicast, instead of using unimodal-circular nonblocking switch for point-to-point connection, is well known. Thus, it would have been obvious to the person of ordinary skill in the art at the time of the invention to replace unimodal-circular nonblocking switch for point-to-point connection as taught by the '998' with the expander, for providing multicast switch and for increasing trace and guide by the use of recursive X2 interconnection network of cells.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Krishnamoorthy et al. (U.S.5,541,914), **Chen et al.** (U.S.5,671,222), **Chiussi et al.** (U.S.5,689,506), **Kim et al.** (Nonblocking Property of Reverse Banyan Networks, March 1992, IEEE Transactions on Communications Vol. 40, IEEE 0090-6778/92/0300, pages 472-476) and **Ahmadi et al.** (A High-Performance Switch Fabric for Integrated Circuit and Packet Switching, 6/1988, IEEE CH2534-/6/88, pages 9-18) are all cited to show devices and methods for

improving packet-switched self-routing multistage networks in the telecommunication architectures, which are considered pertinent to the claimed invention.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tri H. Phan, whose telephone number is (571) 272-3074. The examiner can normally be reached on M-F (8:00-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chau T. Nguyen can be reached on (571) 272-3126.

Any response to this action should be mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 872-9314

Hand-delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office, whose telephone number is (703) 305-3900.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tri H. Phan
March 1, 2005

BRIAN NGUYEN
PRIMARY EXAMINER